

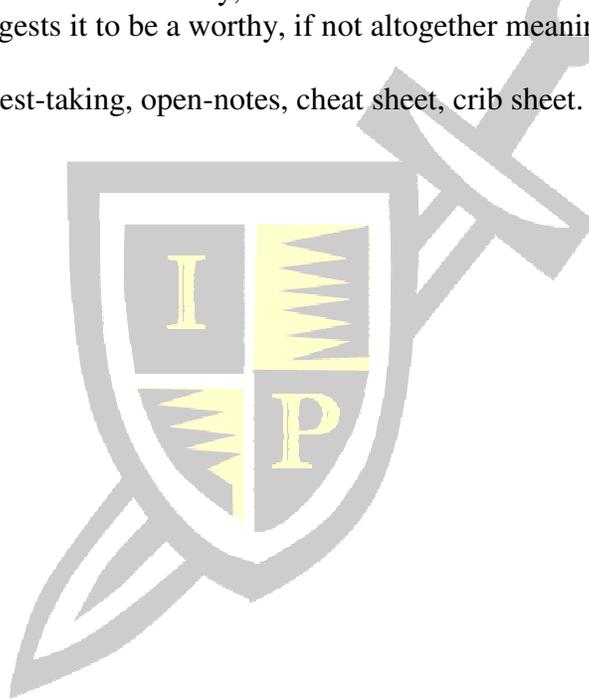
Should notes be permitted during testing?

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ABSTRACT

Student preference for use of notes during test-taking, and performance outcomes with and without notes, is documented. While alleviating testing anxiety, usage of notes does little to affect testing outcomes, either positively or negatively. This study, undertaken across four semesters, both with and without use of a note sheet, finds no significant difference in learning outcomes. For those reluctant to embrace note usage during testing, this research dispels the notion that notes hinder learning. Yet for supporters of allowing notes, no improvement in learning outcomes is evident. In summary, the benefits of reduced stress and a strong student preference for notes suggests it to be a worthy, if not altogether meaningful, practice.

Keywords: note sheet, test-taking, open-notes, cheat sheet, crib sheet.



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INTRODUCTION

Permitting use of a note sheet has become a widespread practice on the author's campus, a mid-sized, public, comprehensive U.S. university. Possibly influenced by ever-increasing on-line offerings, where "open-notes" is the default norm, students are increasingly conditioned to their use. The author's acquiescence was not difficult, as recollections of graduate school where note usage for exams was not an unusual practice. Access to notes may result in a more organized review, with more time spent altogether, given the pressure of attaining an "edge" in test-taking. Moreover, permitting a one-page sheet, 8.5'x11' maximum, both sizes, compels organization and thoughtfulness in crafting the best possible testing aid. In the end, hours spent fine-tuning this document may negate its usefulness, as its content becomes so familiar as to render it unnecessary. Anecdotal evidence aside, and with little literature-review guidance, testing was conducted over four semesters prior to the author's implementation of a "note-sheet-permitted" testing policy.

LITERATURE REVIEW

The literature on the use of open-notes for test-taking is thin and inconclusive. A 2005 study by Dickson and Miller found that the authorized use of notes did not improve performance, although it did lessen testing anxiety. Reduced test stress was also found by Drake, et al. (1998). Duncan (2007) found that students using a note sheet performed slightly better than students who were closed-note tested. Weimer (2013), concludes that permitting notes results in enhanced student learning, although her evidence is anecdotal. To the contrary, Dickson and Bauer (2008) assert that inferior learning outcomes occur when notes are permitted for test-taking. Phillips' (2012) had a hunch that the process of organizing a "cheat sheet" (not open notes, but one page, both sides) helps students with learning and preparation. He discovered, however, that while students spent more time studying and preparing for "cheat-sheet" exams, there was no correlation between the use of notes and test scores.

The effects of open-book testing are likewise uncertain. Moore and Jensen (2007), as well as Agarwal, Karpicke, Kang, Roediger, and McDermott (2008), found that open-book exams do not lead to long-term learning. Students are better organized but there is no evidence of lasting learning. Further, Heijne-Penninga, Kuks, Hofman, and Pelech concluded that open-book exams do not stimulate deep learning. A similar outcome as discovered by Li (2013), with long-term retention between open-book versus closed book/notes formats yielding insignificant differences. Finally, comparing the effects of an open-book examination with a closed-book format, Leung et. al. (2014) found that differences were insignificant.

RESEARCH DESIGN AND METHODOLOGY

Students from four sections of a junior-level finance course, Financial Institutions, were queried as to their perception of the value of using notes for exams (see Appendix, Figure 1). Optional comments follow instrument findings. Students were also tested with a General Knowledge Quiz (GKQ) prior to the administration of the final exam (see Appendix, Figure 2). The GKQ was deemed a better proxy for assessing student knowledge than final course grade, as grades reflect a course-specific curve. Reliability and validity were measured with the *MS Excel* correlation function. The GKQ was given over four semesters: Spring, 2017 ($n = 13$), Fall, 2017

($n = 12$), Spring, 2018 ($n = 18$), and Fall, 2018 ($n = 19$). No use of notes permitted during the administration of the GKQ. Students were incented with an “upgrade” on their lowest in-class assignment grade, should their GKQ grade be higher.

The two fall sections ($N = 31$) were *not* permitted to use notes for the three exams during the semester. Two spring sections ($N = 31$) *were* permitted to use notes for their exams. The note sheet could be no larger than 8.5' x 11,' both sides (see sample in Appendix, Figure 3).

Performance outcomes, and testing for significant differences between means, were measured using a paired *t*-test for independent samples through SPSS.

FINDINGS

As Figure 1 demonstrates, students' preference for using notes during test-taking is unambiguous. They assert both greater knowledge of tested material (1.41 on a 1-to-5 scale), as well as more time spent in test preparation (1.94 on a 1-to-5 scale). They also claim use of a note sheet is widespread (at least 50% of courses), even if unrestricted use of all materials is not (fewer than 25% of courses).

The testing instrument, GKQ, was reviewed for reliability and validity. Pearson correlation coefficient between test scores and final course grade was measured across all four semesters, Spring, 2017, through Fall, 2018. Final course grades used were ordinal, i.e., students' overall percent grade (not letter grade). Semester-specific *r*-values in forward chronological order: .8789, .7970, .8102, .8121. Correlation similarity attests to instrument reliability. Validity was measured by the correlation coefficient for all four semesters combined, or $R = .7816$. This suggests a strong, positive relationship between GKQ scores and final course grade.

In terms of performance outcomes, although the stated mean is higher for class sections without notes ($M = 6.94$) compared to those with notes ($M = 6.65$), this difference is *not* significant at the .05 level of confidence, $t(60) = 0.774$, $p = 0.442$. The *p*-value of 0.442 indicates strong support for the null hypothesis of equality between group means. Also notable is the similar dispersion in the standard deviations of the two groups. See Appendix, Figure 4.

CONCLUSIONS

Despite student preference for note usage during test-taking, and some anecdotal evidence supporting this practice, the data does not support this view. Use of limited notes neither helps nor hinders student learning outcomes. Students, however, have a strong preference for use of notes, asserting both improved learning and greater time devoted to test preparation. Instructors may acquiesce in allowing limited notes to appease students. While a benign decision from a learning outcomes point of view, it may improve the student learning experience.

APPENDIX

Figure 1 – Student perceptions of the value of a note sheet for test-taking.

Question	Mean/Standard deviation	1	2	3	4	5
What percent of your f2f classes permit use of a <i>note sheet</i> ?	2.90/1.17	90% – 100%	75% - 90%	50% – 75%	25% - 50%	<25%
What percent of your f2f classes permit use of <i>all</i> materials?	4.04/1.07	75% - 100%	50% – 75%	25% – 50%	10% – 25%	<10%
Did you learn more or less having access to notes?	1.41/0.537	Much more	More	About same	Less	Much less
Did you study more or less, having access to notes?	1.94/1.029	Much more	More	About same	Less	Much less

Comments:

- *The use of a note sheet helps me study a lot better b/c I'm not just trying to cram things into my head.*
- *Notes helped me to prepare (since it's limited to one sheet). I reviewed by notes more carefully to prioritize.*
- *Notes helped me a lot, whether in testing or learning.*
- *This was really helpful to study because I would go through book and then make my note sheet.*
- *I rarely look at the sheet during the test because I feel I know the material.*
- *Having a note sheet allows me to study while making the sheet.*
- *Logical to have notes as it is similar to the real world with access to information.*
- *For me, it helps really learn the material so I can apply it on the exam.*
- *Having a note sheet helps me feel more prepared and confident when taking tests.*
- *Taking a test without notes only tests your memory, not your ability to take the concepts discussed in class and apply them to relevant situations.*
- *Helps me not second-guess myself.*
- *Super helpful!*

Figure 2 – General knowledge questions (correct response bolded)

1. Canada and the U.S. are major trading partners. If Canada experiences a major increase in economic growth, it could place _____ pressure on Canadian interest rates and _____ pressure on U.S. interest rates.
 - a. **upward; upward**
 - b. upward; downward
 - c. downward; downward
 - d. downward; upward
2. As the supply of funds in the banking system _____, the federal funds rate _____.
 - a. **increases; declines**
 - b. increases; increases
 - c. declines; declines
 - d. none of the above
3. A high budget deficit tends to place _____ pressure on interest rates; the Fed's tightening of the money supply tends to place _____ pressure on interest rates.
 - a. downward; downward
 - b. downward; upward
 - c. **upward; upward**
 - d. upward; downward
4. Jarod King, a private investor, purchases a Treasury bill for \$10,000 with a par value of \$9,645. One hundred days later, Jarod sells the T-bill for \$9,719. What is his annualized yield from this transaction?
 - a. 13.43 percent
 - b. 2.78 percent
 - c. 10.55 percent
 - d. **2.80 percent**
5. Robbins Corp. frequently invests excess funds in the Mexican money market. One year ago, Robbins invested in a one-year Mexican money market security that provided a yield of 25 percent. At the end of the year, When Robbins converted Mexican pesos to U.S. dollars, the peso had depreciated from \$0.12 to \$0.11 (direct quotation). What is the effective yield earned by Robbins?
 - a. 25.00 percent
 - b. 35.41 percent
 - c. **14.59 percent**
 - d. None of the above
6. If a bank's bond portfolio has an average maturity of 17.6 years and a duration of 14.9 years, what would be the average change in portfolio value, assuming a 2 percent decrease in interest rates?
 - a. **Increase of 29.8 percent**
 - b. Decrease of 29.8 percent
 - c. Increase of 35.2 percent
 - d. Decrease of 35.2 percent
7. The moral hazard issue is minimized when deposit insurance premiums are
 - a. Zero (not imposed by the FDIC)
 - b. The same percent of assets for all banks
 - c. Set as a fixed percent of assets for large banks, and zero for small banks

- d. Set as a percent of assets based on a bank's risk level**
8. Given net income = \$2,000, assets = \$180,000, revenues = \$66,000, liabilities = \$4,000, deposits = \$158,000, what is the bank's return on equity?
- a. **11.1 percent**
 - b. 0.9 percent
 - c. 2.0 percent
 - d. 1.1 percent
9. Compared to other lending institutions, finance companies have a _____ loan delinquency rate, and their average rate charged on loans is _____ on average.
- a. Lower; higher
 - b. Lower; lower
 - c. Higher; lower
 - d. **Higher; higher**
10. Given a dividend distribution of \$1.36, a realized capital gain of \$2.48, a beginning NAV of \$88.00, a NAV at year's end of \$92.00, and a 5 percent sales load, find percent return:
- a. 3.93 percent
 - b. 3.91 percent
 - c. 3.71 percent
 - d. **3.73 percent**

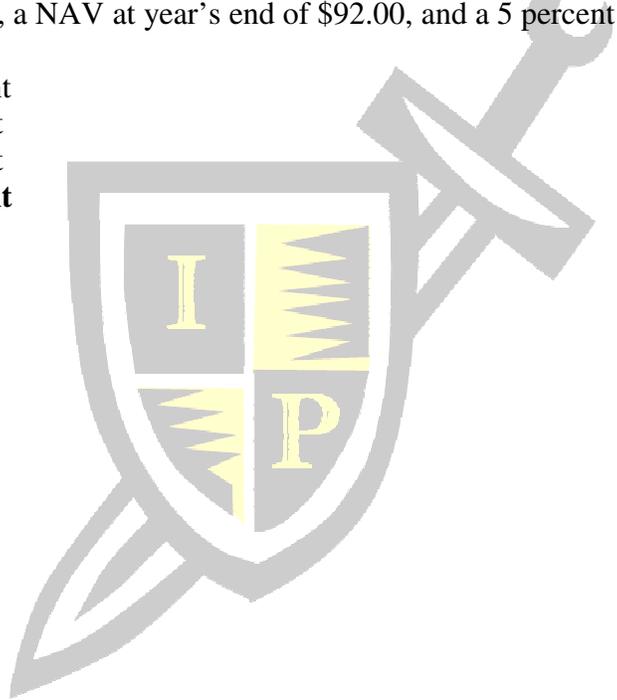
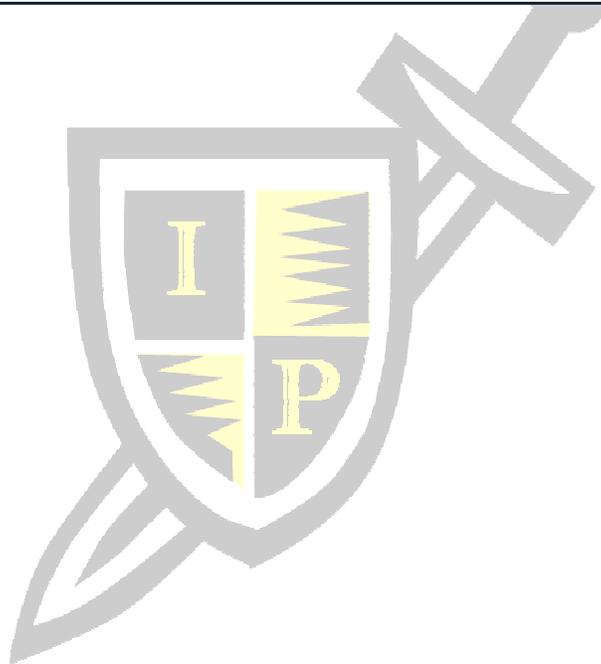


Figure 4 – Results of independent t-test

Group Statistics				
Notes	N	Mean	Std. Deviation	Std. Error Mean
no notes	31	6.9355	1.43609	.25793
notes	31	6.6452	1.51764	.27258

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	.061	.806	.774	60	.442	.29032	.37527	-.46032	1.04097
Equal variances not assumed			.774	59.818	.442	.29032	.37527	-.46037	1.04102



REFERENCES

- Agarwal, P. K., Karpicke, J. D., Kang, S. H., Roediger, H. L., & McDermott, K. B. (2008). Examining the testing effect with open- and closed-book tests. *Applied Cognitive Psychology, 22*(7), 861-876.
- Dickson, K. L., & Bauer, J. J. (2008). Do students learn course material during crib sheet construction? *Teaching of Psychology, 35*(2), 117-120.
- Dickson, K. L., & Miller, M. D. (2005). Authorized crib cards do not improve exam performance. *Teaching of Psychology, 32*(4), 230-235.
- Drake, V. K., Freed, P., & Hunter, J. M. (1998). Crib sheets or security blankets? Issues in *Mental Health Nursing, 19*(3), 291-300.
- Duncan, D. G. (2007). Student performance shows slight improvement when open notes are used during information systems exams. *Journal of Information Technology Education, 6*, 361-370.
- Heijne-Penninga, M., Kuks, J., Hofman, W., & Cohen-Schotanus, J. (2010). Influences of deep learning, need for cognition and preparation time on open- and closed-book test performance. *Medical Education, 44*(9), 884-891.
- Leung, J., Kumta, S., Yung, A., & Jin, Y. (2014). Testing the level of knowledge transfer via an open-book version closed-book examination [Supplemental material]. *Medical Education 1-2*.
- Li, B. (2013, April 22). Educational theory and practice: Open-note vs. closed book [Web log post]. Retrieved from <http://edtheory.blogspot.com/2013/04/a-closer-look-at-open-notecheat-1-sheets.html>
- Weimer, W. (2013). Crib sheets help students prioritize and organize course content. Retrieved from <http://www.facultyfocus.com/articles/teaching-professor-blog/crib-sheets-helpstudents-prioritize-and-organize-course-content/>